ABSTRACT OF THE DISCLOSURE

A delivery system and method are provided for accurately locating, orienting, and implanting expandable tissue supporting devices at a lumen junction or bifurcation in a body lumen. For example, the system may be used to deliver a tissue supporting device to a bifurcated artery such that, on expansion, the tissue supporting device provides side ports of a specific size and geometry to accommodate bifurcations in the artery. The delivery system is capable of accurately orienting these side ports both radially and longitudinally with respect to branch lumen openings of the artery. The delivery system achieves orientation by utilizing a guide member which is positioned to extend from the side port feature of the tissue supporting device. The guide member is tracked along a guidewire which extends into the branch lumen, ultimately orienting the side port of the tissue supporting device properly at the branch lumen opening. After expansion of the tissue supporting device, the guide member drops out of the enlarged side port and is withdrawn.